Effect of Ramadan fasting on pro-inflammatory cytokines in normal healthy non obese female medical students in college of medicine-Tikrit University.

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Abstract

Background: Ramadan is the holiest month in the Islamic calendar. Fasting in this month is one of the five pillars of Islam. Fasting is obligatory for all adults and healthy Muslims during the day hours for the whole month every year. It is the month during which Muslims refrain from food, and liquids during daylight hours and eat a main meal after sunset. The aim of study is to investigate the effects of fasting on lipid profile, IL-6 and TNF among healthy female medical students in Tikrit University.

Subjects and methods: A follow up study was done in college of medicine – Tikrit university during Ramadan fasting month at 1441, (May 2019) on female medical female student of 2nd year. A total of 20 female students in this study were female aged 19-20 years, none obese, do not have a history of diabetes, do not have hypertension and not an athlete. Female was used as subjects because they can do full time of Ramadan fasting. Female students not complete consecutive 21 days of fasting were excluded from the study. At a day one (beginning of Ramadan) and at day 21 (21th day) of Ramadan fasting, blood sampling were taken to be analyzed of lipid profile, and inflammatory indicators (TNF-α and IL-6). According standard procedures. Results: Regarding body weight, and BMI, in the present study, there is significant reduction in body weight and BMI in day 21 of Ramadan fasting as compare with beginning of fasting. In the present study, there is a significant reduction in the concentrations of serum triglycerides, total cholesterol, LDL-c and VLDL-c at 21th day of Ramadan fasting as compare to the beginning of Ramadan fasting. However, there is significant increase in the concentration of serum HDL-c at 21 day of Ramadan fasting as compare with the beginning of fasting, (p≤ 0.01). In the present study, it were found that there is significant reduction in the concentration of IL-6 and TNF-α in female subjects at day 21 of Ramadan fasting as compare with that at the beginning of fasting, (p≤ 0.01). The present study conclude that were significant reduction in the concentration of IL-6 and TNF-α in female subjects at day 21 of Ramadan fasting as compare with that at the beginning of fasting, (p≤ 0.01).

Keywords: Ramadan fasting, body weight, lipid profile, IL-6, TNF


Introduction

Fasting Ramadan is one of best model to determine the changes of lipid profile and glucose during fasting. A previous study by using control trial by normal healthy subjects determine fasting Ramadan decrease blood pressure are, total cholesterol and weight are significant, (1,2). Previous study was done on 32 healthy men, it was found that there are significant differences between before Ramadan and
during Ramadan, regarding serum cholesterol and triglycerides significantly reduced subjects who fast Ramadan. Also, HDL-c (high density lipoprotein) increase and LDL also decrease significantly, (3).

Previous study done on over weight subjects Jawa Timur Province, Indonesia found that the fasting of Ramadan is able to decrease the food intake and BMI significantly. Also, total Cholesterol and LDL were significant different after 14 days of Ramadan fasting. The TG, HDL, TNF-α and IL-6 were not significant different, (4). Fasting gives the digestive chance to rest, improve the regeneration of cells of the gastrointestinal tract instruments, as well as reducing the workload of digestion. Those are occurred due to a diet change from three meals a day to two times and reducing habits of snacks consumption during fasting, (5). Furthermore, fasting can reduce blood sugar levels, triglyceride and blood pressure and accidental change of low density lipoprotein (LDL), without the addition of HDL and increasing human growth hormone response (HGH) which protects muscle and metabolic balance, (6). When fasting, a change in diet of three meals a day to two times. When not fasting, some people often eat snacks that contain lots of triglyceride. So that by fasting, we can reduce the habit, (7,8).

This present study aim to evaluate the effect of Ramadan fasting lipid profile and pro-inflammatory cytokines.

Subjects and methods

A follow up study was done in college of medicine – Tikrit university during Ramadan fasting month at 1441, (May 2019) on none obese medical female student of 2nd year. A total of 20 female Student in this study were female aged 19-20 years, none obese, do not have a history of diabetes, do not have hypertension and not an athlete. Female was used as subjects because they can do full time of Ramadan fasting. Female student woman not complete consecutive 21 days of fasting were excluded from the study. The protocol of the research have already approved by Scientific Ethical Committee of college Medicine, University of Tikrit. At a day one (beginning of Ramadan) and at day 21 (21th day) of Ramadan fasting, blood sampling were taken to be analyzed of lipid profile, (9) and inflammatory indicators (TNF-α and IL-6). According standard procedures, (10) During the fasting, subjects are asked to avoid fat food, sweet of simple sugar and record their food intake of breakfast and dinner.

Statistical Analysis

The data of body weight, body mass index, and plasma lipids (TC, TG, HDL and LDL) was analyzed using repeated ANOVA followed by LSD test. The data of pro-inflammatory cytokines (IL-6 and TNF-α) was analyzed using paired t-test. P value of less than 5 (p≤ 0.05).

Results

Table 1 summarized the effect of Ramadan on fasting blood sugar, (FBS), body weight and body mass index, (BMI).

Table 1 Body weight, and body mass index and fasting blood sugar, (FBS) before of female students at 21th days of Ramadan fasting.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Before</th>
<th>21th day</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight (kg)</td>
<td>76.2 ± 9.4</td>
<td>61.0± 5.8</td>
<td>0.05</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>25.1 ± 4.2</td>
<td>22.6 ± 3.1</td>
<td>0.05</td>
</tr>
<tr>
<td>FBS (mmol/l)</td>
<td>3.57 ± 0.41</td>
<td>3.14 ± 0.36</td>
<td>NS</td>
</tr>
</tbody>
</table>

There were significant decrease in body weight and body mass index (BMI) at the end of Ramadan fasting as compare with beginning of Ramadan fasting, (p≤ 0.05). In regard to fasting blood sugar, there is no significant difference regarding blood glucose from at day 21 of Ramadan fasting as compare with the beginning of Ramadan fasting. Table 2 show the result of lipid profile at the beginning of Ramadan fasting and at 21th day of fasting. As table 2 show, there is a significant reduction in the concentrations of serum triglycerides, total cholesterol, LDL-c and VLDL-c at 21th day of Ramadan fasting as compare to the beginning of Ramadan fasting.

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Table 2 show the result of lipid profile before and at the 21th day of Ramadan fasting of female students.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Before</th>
<th>21th day of fasting</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG</td>
<td>230 ± 9</td>
<td>121.8 ± 18.9</td>
<td>0.01</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>219 ± 8.2</td>
<td>169.4 ± 17.5</td>
<td>0.01</td>
</tr>
<tr>
<td>LDL</td>
<td>153 ± 20</td>
<td>111.9 ± 3.9</td>
<td>0.01</td>
</tr>
<tr>
<td>VLDL</td>
<td>49.1 ± 2.3</td>
<td>15.1 ± 3.1</td>
<td>0.01</td>
</tr>
<tr>
<td>HDL</td>
<td>27.3 ± 3.2</td>
<td>43.6 ± 4.2</td>
<td>0.01</td>
</tr>
</tbody>
</table>

However, there is significant increase in the concentration of serum HDL-c at 21 day of Ramadan fasting as compare with the beginning of fasting, (p≤ 0.01). Moreover, Table 3 show the result of IL-6 and TNF at 21th days of fasting and before Ramadan fasting.

Table 3 show result of serum IL-6 and TNF at the 21th day and at the beginning of Ramadan fasting in female students.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Before</th>
<th>21th day of R. fasting</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-6</td>
<td>18.2 ± 2.4</td>
<td>6.3 ± 1.3</td>
<td>0.01</td>
</tr>
<tr>
<td>TNF-α</td>
<td>14.6 ± 3.5</td>
<td>5.1 ± 2.1</td>
<td>0.01</td>
</tr>
</tbody>
</table>

There is significant reduction in the concentration of IL-6 in female subjects at day 21 of Ramadan fasting as compare with that at the beginning of fasting, (p≤ 0.01). Also, there is significant reduction in the concentration of TNF-αin female subjects at day 21 of Ramadan fasting as compare with that at the beginning of fasting, (p≤ 0.01).

Discussion

Regarding body weight, and BMI, in the present study, there is significant reduction in body weight and BMI in day 21 of Ramadan fasting as compare with beginning of fasting. The present study not agree with previous study which found a controversy result, There is a non significant reduction in body weight at the end of Ramadan as compare with the beginning of Ramadan fasting, (11).This may be due to short duration of fasting (30 days) & does not inflict any change on body weight, (12,13).

In the present study, there is a significant reduction in the concentrations of serum triglycerides, total cholesterol, LDL-c and VLDL-c at 21th day of Ramadan fasting as compare to the beginning of Ramadan fasting. However, there is significant increase in the concentration of serum HDL-c at 21 day of Ramadan fasting as compare with the beginning of fasting, (p≤ 0.01).The present result agree with previous finding, (14, 15). Previous studies of the triglycerides level showed significantly decrease during of Ramadan probably due to the change of the proportion of type of fat intake that observed in the studies and it showed that the consumption of low fat diet will induces decrease of triglycerides, (3). In the present study, it were found that there is significant reduction in the concentration of IL-6 and TNF-α in female subjects at day 21 of Ramadan fasting as compare with that at the beginning of fasting, (p≤ 0.01). Previous study conducted on 50 subjects reported that the concentration of interleukin 6 (IL-6), IL-1β and tumor necrosis factor-α (TNF-α), and the number of total leukocytes, granulocytes, lymphocytes and monocytes were significantly decreased during Ramadan in comparison to pre-Ramadan. (16). Previous study compare IL-6 and TNF at day 14 of Ramadan fasting and with the beginning of fasting. It was found that IL-6and TNF-α were not significant different, (4).This finding not agree with the present study.

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References


Wan Ismahanisa Ismail, and Norhisham Haron. Effect of Ramadan Fasting on Serum Lipid Profile among Healthy Students in UiTM. International Conference on Biological, Chemical and Environmental Sciences. 2014;